What is claimed is:

1. A plasma processing system that propagates plasma-producing radio-frequency waves generated by a radio-frequency power supply system through a flat antenna and a radio-frequency wave transmitting window into a vacuum vessel, produces a plasma by ionizing a process gas supplied into the vacuum vessel by the energy of the radio-frequency waves and processes a substrate placed on a substrate table arranged in the vacuum vessel with the plasma;

wherein an electromagnetic wave absorber is disposed so as to surround a region between a surface of the radio-frequency wave transmitting window on a side of a vacuum atmosphere in the vacuum vessel and the antenna.

- 2. The plasma processing system according to claim 1, wherein the electromagnetic wave absorber is divided into a plurality of divisions, the divisions are arranged at circumferential intervals with spaces formed between the adjacent divisions.
- 3. The plasma processing system according to claim 2, wherein a circumferential length of each of the divisions and a circumferential length of each of the spaces between the divisions are smaller than $\lambda_g/2$, where λ_g is a wavelength of the radio-frequency waves.
- 4. The plasma processing system according to any one of claims 1 to 3, wherein the electromagnetic wave absorber has a cross section of a circumferential width that decreases toward the center of the vacuum vessel.
- 5. A plasma processing system that propagates plasma-producing radio-frequency waves generated by a radio-frequency power supply system through a flat antenna and a radio-frequency wave transmitting window into a vacuum vessel, produces a plasma by ionizing a process gas supplied into the vacuum vessel by the energy of the radio-frequency waves and

processes a substrate placed on a substrate table arranged in the vacuum vessel with the plasma;

wherein a region between an area between the radio-frequency wave transmitting window and a plasma luminescent area, and a surface of the radio-frequency wave transmitting window on the side of the antenna is divided in a direction perpendicular to the direction of propagation of the radio-frequency waves by conductive members.

- 6. The plasma processing system according to claim 5, wherein an end part of the conductive member on a side of the substrate table extends into the plasma luminescent area.
- 7. The plasma processing system according to claim 6, wherein length of the end part of the conductive member extending in the plasma luminescent area is in a range of 5 to 10 mm.
- 8. The plasma processing system according to claim 5, wherein the conductive member includes a circular or annular first conductive element substantially coaxial with a center axis of the substrate table.
- 9. The plasma processing system according to claim 8, wherein the conductive member includes an annular second conductive element surrounding the first conductive element and concentric with the first conductive element.
- 10. The plasma processing system according to claim 8 or 9, wherein the first conductive element has an inside diameter R1 meeting an inequality: $\lambda/2 \le R1 < \lambda.e$ R2, where λ is wavelength of the radio-frequency waves.
- 11. The plasma processing system according to claim 9, wherein the first conductive element has an inside diameter R1 meeting an inequality: $\lambda/2 \le R1 < \lambda$ and a distance R2 between the concentric first and the second conductive elements meet an inequality: $\lambda/2 \le R2 < \lambda$, where λ is wavelength of the radio-frequency waves.

12. The plasma processing system according to claim 5, wherein the region is divided by a plurality of radial conductive elements arranged at angular intervals.